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FRONT COVER

A Swiss Market

In the past few years, food markets of Western Europe have been well stocked. Europe is prosperous: It is producing more farm products at home, and it is buying more food abroad. A key to U. S. agriculture's increasing its share in this expanding foreign market is price competition. (Photo courtesy of Swiss National Tourist Office.)

BACK COVER

Leading Agricultural Export Commodities Decline, Others Increase

Leading U. S. crops figured most prominently in the farm export decline from the fiscal year 1951-52. Grain exports dropped by $720 million and cotton exports by $554 million. Exports of other crops declined little; some even increased.

NEWS NOTE

GATT—Ninth Session Opens

The Ninth Session of the Contracting Parties to the General Agreement on Tariffs and Trade (GATT) opened in Geneva on October 28. Of particular interest this year is the review of the Agreement, which has been in effect for nearly 7 years—years of great change in world economic conditions. Discussions will cover the structure and functions of the organization plus such matters as agricultural quotas and export subsidies, import restrictions for balance-of-payments reasons, the stability of tariff concessions, and the special problems of underdeveloped countries. In addition to the review of GATT, which is expected to last over 2 months, the Contracting Parties will discuss a long agenda covering current GATT problems. The United States will report on certain measures that it has been required to take under its agricultural legislation involving restrictions on imports of agricultural products. It is also expected to again seek consideration by the Contracting Parties of import restrictions imposed by other countries on certain of its products. Of special interest to agriculture will be the discussions with countries still maintaining restrictions on imports for balance-of-payments reasons. The removal of these restrictions will make more effective the tariff concessions granted to the United States as a result of the three tariff negotiating conferences held under GATT since 1948.

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FOREIGN AGRICULTURE ALICE FRAY NELSON, EDITOR

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What We Can Learn from Last Year's Farm Export Trade*

Our investment in world peace and economic recovery abroad has been based on the premise that our own well-being is dependent on peace and prosperity in the rest of the world. United States agriculture has contributed much to this investment. It sent increased quantities of food and fiber abroad during the war and recovery years when Europe's agriculture was crippled. Its foreign sales grew, and various aid programs paid much of the bill.

Today, with the world no longer at war and production in Europe back to normal, United States agriculture finds shrinking outlets for the products of its greatly enlarged productive capacity. And the premise on which our investment has been based faces an acid test: Can prosperity abroad mean prosperity also for United States agriculture?

During World War II, United States agricultural exports increased in quantity by about one-half over prewar. Postwar recovery further boosted our farm exports. In 1951-52, Korean hostilities caused foreign customers to stock up for possible emergencies and our agricultural exports reached a peak. Then, when the emergency eased, agricultural exports nose-dived. They dropped from $4,053 million in 1951-52 to $2,819 million in the following fiscal year. The sudden, sharp drop made us aware that United States agriculture faced a serious problem. Would the decline continue? Where would be the bottom? Could our agricultural export trade prosper only in periods of a world catastrophe?

Events of the past year provide some answers to these and similar questions—to what the exporters of American farm products can expect to face as the world returns to normal trade.

Here are the highlights of the 1953-54 season:

Agricultural exports have recovered moderately. United States exports of farm products recovered in fiscal year 1953-54 to a value of $2,933 million, an increase of 4 percent over the preceding year. A smaller share of the total was through governmental foreign-aid gifts and grants: 12 percent compared with 15 percent the preceding year. Nonaid shipments were valued at $2,573 million in 1953-54 compared with $2,390 million in 1952-53, an increase of 7 percent. The value last year was surpassed only twice during the 10 preceding years: $2,810 million in 1946-47 and $3,472 million in 1951-52.

Value of United States agricultural exports of domestic origin, 1952-53 and 1953-54

	1952-53[1] Thousands of dollars	1953-54[1] Thousands of dollars
Grains and preparations	1,167,282	856,405
Cotton, excluding linters	571,115	673,151
Tobacco, leaf	284,667	298,952
Oils, vegetable, expressed	36,022	88,250
Oilseeds	96,275	134,472
Oils, fats, and greases (animal)	105,853	138,555
Fruits and preparations	132,603	146,082
Dairy products	64,872	80,467
Eggs and egg products	21,059	18,814
Meats	36,246	43,762
Vegetables and preparations	91,733	86,699
Other agricultural	211,037	367,851
Total agricultural	2,818,764	2,933,460
Total, all commodities	15,121,507	15,196,840

[1] Year beginning July 1.

Commodity trends are more revealing than overall change. A rundown of the major commodity groups brings out this fact: Grain exports, the biggest single factor in United States agriculture's foreign trade, decreased by 27 percent from 1952-53 to 1953-54. Most other commodity groups showed good export gains or held steady compared with the year before.

The European market is the principal factor in United States export changes. Europe is the principal recipient of United States farm products, accounting for 45 percent of the total in 1953. Of the drop in exports that occurred between 1951 and 1953, 75 percent was in shipments to Europe. Ex-

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* Prepared by the Trade Statistics and Economic Geography Branch, FAS.

TABLE 1.—Economic conditions and trade in Europe, 1950-53[1]

[Volume indexes]

Calendar year	Industrial production	Total imports	Food imports	Agricultural production[2]
1950	100	100	100	100
1951	110	111	112	107
1952	111	108	110	110
1953	116	116	112	114

[1] OEEC countries only: Austria, Belgium-Luxembourg, Denmark, France-Saar, Germany (Federal Republic), Greece, Iceland, Ireland, Italy-Trieste, Netherlands, Norway, Portugal, Sweden, Switzerland, Turkey, and the United Kingdom.

[2] Fiscal years 1949-50 through 1952-53.

panding production and the using up of stocks built up in 1951 and 1952 in Europe explain in large part what is happening in the United States farm export market.

Since 1950, agricultural production in the OEEC[1] countries has risen steadily; industrial production also has gone up, resulting in greater purchasing power. These improving economic conditions have enlarged the market for imports. But total imports have increased more than food imports. Grain imports, badly needed in Europe before agricultural production was restored, are no longer so badly needed there. But many of the less-basic commodities—those that Europeans generally had to do without during the war and recovery periods—are enjoying a better market in Europe.

Wheat exports continue to suffer from restored European output and lower world prices. The declining world trade in wheat in the past 2 years has affected the United States more than the other major exporters. Competition for the smaller export market has driven world wheat prices below United States levels. The United States export total for fiscal year 1953-54 of 219 million bushels was 32 percent less than in 1952-53 and 54 percent less than in 1951-52. But our wheat exports are still well above prewar. World trade has declined because of improved supplies in importing countries. European production in 1953-54 was 1,705 million bushels, just under the record crops of 1933 and 1938.

Record foreign mill consumption aids cotton exports. The United States shipped out 3.8 million bales (500 pounds gross) of cotton last year, a gain of 0.7 million over the year before. Biggest factor in the gain was the West European market. Cotton trading was favored by record foreign mill consumption, a result of increased purchasing power abroad. Thus, most competitive surpluses abroad were liquidated, and prices consequently increased to more competitive relationships with United States prices.

Tobacco sales hold steady as Western Europe maintains its purchases. Our tobacco exports amounted to 456 million pounds last year, or about 2 percent larger than in fiscal year 1952-53. As in other years, about three-quarters of these exports went to Western Europe. The steady market reflects continued improvement in dollar earnings of important takers, stock replacement, and preference for the high-quality United States leaf.

Corn exports drop. Foreign demand for United States corn continued at a high level during the first half of 1953-54, mainly because of heavy feed requirements in Europe, but exports for the year as a whole declined to 111 million bushels compared with 126 million in 1952-53. The reduction in the last half of the year was attributed mainly to the return of Argentina as an important exporter.

Rice sales increase through Japan's purchases. Our commercial exports of milled rice in 1953-54 totaled 1.6 billion pounds, second highest export level on record, as compared with 1.4 billion pounds in 1952-53 and the record of 1.7 billion pounds in 1951-52. Japan has become an excellent customer for United States rice, and large quantities continue to go to Cuba, traditionally the United States' most important outlet.

Barley export decline reflects smaller import requirements abroad. Exports of barley in 1953-54 totaled only 14 million bushels contrasted with 32 million in 1952-53. Smaller import requirements abroad, increased supplies for export from other areas, and smaller United States supplies were factors in the decline.

CCC sales help increase exports of major vegetable oils and oilseeds. A factor in last year's increased exports of vegetable fats, oils, and oilseeds was the Commodity Credit Corporation's sales for export, especially of cottonseed oil, linseed oil, flaxseed, and

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[1] Countries of the Organization for European Economic Cooperation (OEEC) are: Austria, Belgium-Luxembourg, Denmark, France-Saar, Germany (Federal Republic), Greece, Iceland, Ireland, Italy-Trieste, Netherlands, Norway, Portugal, Sweden, Switzerland, Turkey, and the United Kingdom.

Threshing wheat in France. French farmers, like their neighbors in Western Europe, have increased their output in the past 4 years. Rising agricultural production in Europe is one reason for smaller U. S. exports of staple food crops.

peanuts. Of the $52 million increase in vegetable oils, $5 million was the result of increased flaxseed exports, mostly attributable to CCC sales. The remainder was due to increased sales of soybeans; CCC made no sales for export of this commodity. The higher value of vegetable oils is accounted for almost wholly by CCC sales. Included in these was 302 million pounds of linseed oil, a new United States record. Likewise, the 305 million pounds of cottonseed oil shipped last year was the largest quantity exported since 1914. Brisk movement of CCC stocks of vegetable oils and oilseeds is continuing into the 1954-55 fiscal year.

Record soybean exports reflect shift from oil to whole beans. The increase in exports of soybeans to the record of 41 million bushels in 1953-54 as compared with 30 million in 1952-53 was partly the result of a shift in demand to whole beans away from soybean oil, especially in Europe. Soybean oil exports declined from 122 million pounds in 1952-53 to 89 million in 1953-54, but the drop was more than offset by the gain in exports of soybeans. Europe has been taking more than half of the beans and oil exported by the United States, but Japan was the largest single customer for United States soybeans in 1953-54.

Reduced United States hog slaughter raises lard prices, lowers exports. Our shipments of lard abroad in 1953-54 amounted to 404 million pounds, well below the 470 million pounds exported in the year before. Shipments in both years were smaller than 1951-52's 753 million pounds. Exports in 1952-53 were limited because of smaller United Kingdom purchases; those in 1953-54, mainly because of reduced production in the United States. The resulting higher prices raised the value in 1953-54 above that in 1952-53 even though pounds exported were less.

Tallow, world's "best buy" in soap fats, sets export record. Tallow exports, which have been steadily increasing in the past few years, reached a new record in 1953-54 of 1,041 million pounds. United States tallow has had a strong position abroad as the world's "best buy" in soap fat; in fact, the United States provides 80 percent of the world's tallow exports. Supplies for export have been largely due to increased United States cattle slaughter and the further displacement of soap fats in the United States market by synthetic detergents.

Despite larger foreign output, fresh citrus exports set new record. Fresh citrus exports have increased for 3 successive years and reached a new high in 1953-54. Compared with the 1935-36 to 1939-40 prewar period, sales in 1950-51 and 1951-52 were larger to all major markets except the United Kingdom. The loss there has been more than made up by a gain in the rest of Europe. European demand for United States oranges rose in 1953-54 following the February freeze in Spain.

Movement of CCC stocks accounts for bulk of larger exports of nonfat dry milk. Our increased sales abroad of dairy products in the past fiscal year were accounted for by larger shipments of nonfat dry milk solids. Utilization of CCC stocks under various Government programs was the major factor in raising exports of this commodity to 178 million pounds, against 56 million pounds in 1952-53.

More food parcels are sent abroad. Shipments of food parcels overseas for charity or relief greatly increased in 1953-54; the total of $78 million was several times the level in 1952-53.

Miscellaneous specialty commodities show notable increases also. Other exports that increased in 1953-54 over 1952-53 included evaporated milk, beef and veal, fresh apples and grapefruit, dried prunes, field and garden seeds, and fresh vegetables.

The export picture adds up to this: Continued prosperity abroad is the major sustaining factor in the United States agricultural export market. However, a major share of available foreign dollars goes for our nonfarm products. In the past few years European agriculture has made great recovery and is better able to take care of the food wants of Europeans without heavy reliance on the United States for basic staples, especially bread grains. In addition, Europe and the rest of the world have gone back to trading with United States competitors, whose agricultural production has also been expanding. Nevertheless, foreign countries are now buying many agricultural products that they could afford to buy only in limited quantities during the war and recovery periods—but they are buying where prices are the lowest. Further steps to make United States prices competitive with foreign prices, energetic marketing efforts by the United States, and continued improvement in economic conditions abroad are essential if our agriculture is to export commercially as much as it did under our foreign-aid programs.

Cashew Shell Oil

A byproduct of India's famous cashew nut industry is an oil made from the shells of the nuts. In recent years, production of the oil has been increasing rapidly and is now 15 million to 20 million pounds a year.

The United States is an important buyer of cashew shell oil, and gets nearly all of it from India. In 1946, we took a little more than 3 million pounds; in 1950, about 6 million; and in 1953, nearly 14 million pounds.

Cashew shell oil is a recognized source of many resins and plastics. It is used directly as a preservative in the painting of boats, fishing nets, and light woodwork, and as a waterproofing agent. It is also processed and used for bonding, surface coating, and molding compositions. Its distillation products can be used in various industries, such as the manufacture of insulating varnishes, typewriter rolls, oil-and-acid-proof cold setting cements, industrial flooring tiles, and automobile brake linings.

The New Battle For Grain In Soviet Russia

By LAZAR VOLIN

The new Soviet program for a huge expansion of grain acreage is of more than academic interest to American agriculture. Already Russia has a long, though uneven, history as one of the world's important exporters of small grains; and an increase in its acreage, if carried out, may make it even more of a competitor with the United States in the world market.

Russia's grain[1] problem is not one of burdensome surpluses, but one of inadequate production. Epitomized early in the Soviet regime by the slogan, "Battle for Grain," this problem has been at the very root of the conflict between the Soviet Government and the peasantry, and has been much responsible for the major shifts of Soviet economic policy ever since the days of Lenin.

For this situation responsibility rests on the Soviet Government's discouragingly heavy exactions of grain from the peasantry, under the policies of collectivization and industrialization. Though adhering to these policies since the early 1930's with only relatively minor and temporary deviations, the Government has emphasized expansion of grain production as a major objective. In the early 1930's it relied chiefly on increasing the acreage; but in the later 1930's it began instead to stress improvement of yields per acre, though some expansion was still going on in the eastern part of the country.

After the war, which seriously curtailed grain acreage and production, the Soviet Government more strongly emphasized improvement of yields per acre. Its first postwar 5-year plan (1946-50) called for grain yields 12 percent higher than in 1940, though on a smaller acreage—261 million acres in 1950 as against 273 million in 1940. A second plan (1951-55) called for a 40- to 50-percent expansion in grain production, with a 55- to 65-percent expansion in wheat alone; all but 10 percent was to come from improved yields.

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[1] The term "grain" as used in this article refers to all grains, and not merely to wheat.

TABLE 1.—*Area of new land to be sown to grain in eastern regions of the Soviet Union, 1954-56*

Year	Type of farm				Total area	
	Collective		State			
	Million hectares	Million acres	Million hectares	Million acres	Million hectares	Million acres
1954	1.8	4.5	0.5	1.2	2.3	5.7
1955	6.9	17.0	3.8	9.4	10.7	26.4
1956	—	—	—	—	28-30	69-74

Source: Compiled by Foreign Agricultural Service from official sources.

In this optimistic expectation of high yields, the Soviet Government leaned heavily on the magic tricks of the Michurin-Lysenko "agrobiological" pseudoscience; the related Williams system of crop rotation, which centered about perennial grasses; and the "great Stalin plan for reconstruction of nature," which called for large-scale afforestation and irrigation in the drier regions.

The high production figures published by the Soviet Government in the postwar years appeared to confirm the success of its policy. But these figures were estimates of the so-called biological, or preharvest, yields; they did not take into account the heavy harvesting losses, often officially acknowledged, and thus lent themselves well to propaganda. In any event, G. M. Malenkov, reporting for the Central Committee to the 19th Communist Party Congress in the fall of 1952, stated to the applauding audience that "The grain problem, which was considered formerly the most acute and serious problem, is successfully solved, is solved definitely and irrevocably."

A year later N. S. Khrushchev, top Soviet leader especially concerned with agriculture, also spoke optimistically, though with more caution than Malenkov, about the grain situation, stating that in it "are more considerable achievements than in some other branches of agriculture." He particularly pointed with pride to the wheat acreage, which in 1953 had reached the record figure of 119 million acres—20 million more than before the war. At the same time, however, he stressed the need for further increases in grain output and complained about the low yields on many collective and state farms.

The rather important policy decisions that followed Khrushchev's speech gave only incidental attention to grain. Instead they dealt primarily with livestock, potatoes, and vegetables as the critical phases of Soviet agriculture. Apparently the grain problem, on the whole, was considered solved.

But toward the end of 1953 signs appeared in the Soviet press of a new approach toward the grain situation. These signs multiplied early in 1954, when several agricultural conferences were held in the Kremlin; and in March a report by Khrushchev and several decrees announced a new program.

The new program originally called for no less than 32 million new acres in grain, an increase of 12 percent in 2 years. Production goal for this new area is 18 million to 20 million metric tons, about three-fourths of it to be marketable. Most of the new land is to be plowed as summer fallow or fall plowed, for seeding in the spring of 1955; a small proportion is to be sown in the spring of 1954, most of it to wheat.

The extension is to be brought about entirely by tractor power, in the eastern regions on virgin land or on land long uncultivated. It is to be centered principally in the Urals, Siberia, and Kazakhstan and to a lesser extent in the Volga and North Caucasus and the Far Eastern regions. Kazakhstan alone is to account for nearly half.

In the spring of 1954 nearly 9 million acres were sown and the year's goal exceeded. The next year's target was increased in August 1954 to 37 million acres; and this target was ordered doubled for 1956, to about 70 million acres, equal to more than one-fourth of the total grain area in all Russia in 1953. The immensity of this undertaking looms even larger when it is compared with the wheat area in the United States, which at its highest point, in 1949, was 76 million acres and now is 54 million

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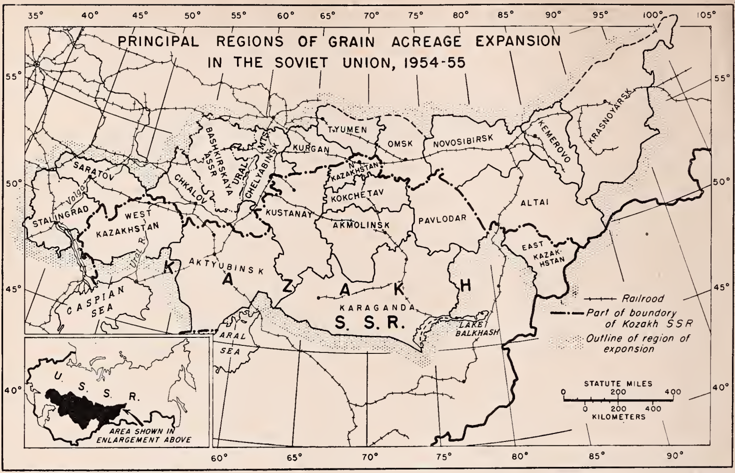

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acres. Other grains will be included in the new Russian acreage, though wheat is the leading crop.

The collective farms, or kolkhozy, will account for most of the 1954-55 target; but for the 1956 goal the large state farms, or sovkhozy, will be principally relied on. Already this year, 124 new sovkhozy have been set up in the eastern region.

More than 150,000 workers and technicians, predominantly young people, have been mobilized from all over the country to migrate to the new farmlands; financial incentives have been offered to the migrants. But stories have appeared in the Soviet press about the lack of preparedness to receive and use these workers, and about the poor housing and harsh living conditions they have found. The magnitude of the new investment required may be gaged from the fact that the equivalent of 50,000 tractors of 15 hp. each has been reported shipped to the area in 1954, as well as 6,300 trucks and many other implements and materials. The whole campaign has been accompanied by much fanfare and propaganda.

The question naturally arises, What lies behind this sudden outburst of activity on the grain front, with its transfer of emphasis from increase of yields per acre to expansion of acreage?

It may not be entirely accidental that the shift in policy coincided with a mediocre harvest in 1953. It is significant, in this connection, that no Soviet source gave any figures for the 1953 grain crop, though previously such figures were annually published. But there may have been another reason for this omission: Malenkov in August 1953 condemned the use of biological crop estimates, which resulted in huge crop figures. In its report on the fulfillment of state goals in 1953 the Central Statistical Administration limited itself to the statement that "although unfavorable weather conditions existed in a number of regions of the country, the actual harvest of grain crops in 1953 is close to the actual harvest of 1952." The latter, incidentally, was a good crop year. Thus, for the time being at least, a disclosure of the extent to which published crop figures were exaggerated is avoided. But is it possible that the Kremlin had been fooled by its huge figures and now saw the light of day? This possibility seems remote: Soviet statistical procedure made good provision for determining the actual barn size of crops.

When we turn back to Khrushchev's report in

March we find that he admits there, even more categorically than he did in September 1953, that yields in many regions are still low and that grain production is "insufficient." The goal he presents is to "considerably increase already in 1954 and 1955 grain production and to increase by at least 35 to 40 percent, as compared with 1953, the compulsory deliveries and purchases of grain"; and the objectives he sets forth for increased production are (1) to satisfy the growing requirements for breadstuffs; (2) to build up stocks needed "for all kinds of eventualities"; (3) to provide an adequate forage supply; (4) to provide an adequate grain supply for regions specializing in nongrain crops; and (5) to increase grain exports.

That the Kremlin, in order to accomplish these objectives, now turns to expansion of grain acreage in regions of precarious farming indicates, more than anything else, a loss of faith in the methods once considered so appropriate for spectacularly increasing yields per acre. The large 12-million-acre irrigation projects in the basins of the Volga, Don, and Dnepr, on which the spotlight of publicity turned brightly during Stalin's last years, have faded from the public eye and are never mentioned by Khrushchev and other Soviet spokesmen. The ambitious afforestation scheme in the dry regions, from which much was expected, also has been considerably deflated. And many of the hopeful plans for the perennial grasses have been abandoned.

Perennial grasses have indeed proved the greatest disappointment of all. These were widely introduced after the war as a result of the official adoption of Williams' crop rotation system; and acreage under such grasses was expanded, not only in the relatively humid regions, to which they were well suited, but in the drier regions as well.

In the drier regions perennial grasses give poor yields and also tend to dry up the soil, rather than to improve its structure. That they would do so, was of course known to Russian dry-farming specialists. But, under the Soviet regime, even research institutions must tailor the results of their investigations to fit the official line. Thus the important Institute of Agriculture of the Southeast, in Saratov, reported during the years 1945-48 that "perennial grasses dry up the soil and disturb the moisture balance." In 1950 it reached exactly opposite conclusions, though they were contrary to well-known facts about agriculture in the region. It would have been perilous for a Soviet scientist to criticize the position on perennial grasses until the Kremlin itself had done so, as it did through Khrushchev in 1954, when he castigated the "mechanical stereotype" introduction of the grasses and severely censured various officials concerned.

One of the worst consequences of the indiscriminate use of perennial grasses was that in a number of regions they replaced higher yielding grains, particularly feed grains. Thus, between 1940 and 1953 the area under perennial grasses increased by 11.1 million acres while that under all grains decreased by 9.4 million. The reduction in grains was particularly severe in feed grains (oats, barley, and corn), of which there were 16.8 million acres less in 1953 than in 1940. And this in the face of a chronic shortage of feed!

Khrushchev estimated that nearly 10 million acres under low-yielding grasses could be plowed up and replanted to grain. Such replanting was partly responsible for the reported increase in 1954 of 15.9 million acres in spring grain. But the addition of grain area as a result of a shift from grasses, as well as the long-advocated extension of grain acreage in the non-black-soil area, is relatively much less significant than the expansion on the uncultivated land in the east, which remains a major operation.

Once it was decided to expand significantly the grain acreage, the eastern regions with their large tracts of uncultivated land, not requiring any reclamation and suitable for power farming, seemed to offer the best solution. Besides, these regions were growing industrially and their food needs were greater; such needs, as well as possibly strategic considerations, may have been among the unstated motives for the new drive.

Although no definitive evaluation of the new program is possible at this juncture, some of the salient factors bearing on the success of the enterprise may be outlined. There can be no question but that a considerable uncultivated area still exists east of the Volga and, particularly, east and south of the Ural Mountains in the wooded steppe and steppe regions. Khrushchev spoke of nearly 100 million acres of uncultivated land in the eastern regions. A considerable proportion of this area is pasture or hay land, which is claimed by Soviet sources not to be very productive.

How much of the uncultivated area in the eastern regions is really suitable for cultivation is a moot question. The Soviet Agricultural Encyclopedia in

1940 gave a figure of more than 27 millions acres in Siberia and Kazakhstan that could be added to the agricultural area during the "next few years." A 3-year government program announced in April 1940 called for an addition of less than 11 million acres of tillable land (not to seeded acreage) in the eastern regions. Of course, the above figures are much more moderate than the current goals. It should be kept in mind that the colonizing and developing of this agricultural frontier has lasted well over half a century. It is not unreasonable to assume that, in this process, much if not most of the better farmland already has been brought under cultivation.[2] However, under the system of continuous cropping which persists in many of these regions despite the drive for crop rotation, a considerable area is permitted to rest for a long time after its fertility is exhausted.

A recent scholarly review of the land situation in Siberia (in *Pochvovederie,* No. 4, 1954) indicates that, even outside the enormous uninhabited forest zone, there is a large area of land not used for crop production, some of which is "quite suitable for plowing." The writer warns that there are also "large areas of land which can be brought into production only gradually after reclamation." A serious difficulty is that, interspersed with the various types of black and chestnut soils in Siberia and Kazakhstan, there are also various alkali soils. That such land should not be used for crop production without some reclamation, is the consensus of all authorities on soils and agronomy. Both they and the Government recommend that the land for the new program be carefully selected.

But the program has been launched on such a scale and with such speed that careful selection has proved difficult. In the course of only 2 years, there is to be added in the eastern regions a grain acreage that is more than double the area added there during 1928-38, a decade of great expansion. In Kazakhstan alone the planned increase is 16 million acres—double the expansion it has known in the 25 years preceding.

An example of the effect of haste in selecting the new land is found in a report from one of the Provinces of Kazakhstan (in *Sovkhoznaya Gazeta,* September 8, 1954). There the new state farms were organized in the winter, when the ground was covered with snow, and "in a number of places the virgin land was not investigated by soil specialists." As a result, 9 out of 25 state farms had to be relocated in the spring. A decree of the Central Committee published on June 27, 1954, called attention to the "errors" in selecting the new land, the allocation of small scattered plots in some regions, and use of some land with alkali soil, despite "the existence of large tracts of good fertile land." As to the use of alkali soils, there are indications that scientists' advice was sometimes disregarded as "too academic."[3]

Other problems are encountered in organizing the new farms. One is inadequate water supply; another is weeds. There is also the danger that in many areas a shift from pasture and meadows to grain, far from being a net gain, will accentuate the chronic forage shortage unless the acreage under feed grains is increased and straw and offal are efficiently utilized. Soviet authorities appear to be aware of this danger, but there is too often a wide gap between awareness and action.

Of all the deficiencies and drawbacks that hamper expansion in the eastern regions, none is more serious than the climate. Owing to the severe winters, attempts to increase grain acreage in many of the eastern regions have not been successful; the Central Committee in its decree published on June 27, 1954, recommended that in such regions winter crops be replaced by spring wheat. Thus Siberia and Kazakhstan are essentially a belt of spring crops, particularly wheat. Even so, the growing period is short, averaging from 120 days in some areas to just under 150 in others. Late frosts in the spring and early frosts in the fall often damage the crops.

But the most limiting factor is rainfall. The annual precipitation, for the most part, is less than 16 inches, and in some sections is only about 10. Strong winds in the winter blow the snow from the fields and so remove a potential source of moisture. Droughts in the late spring and summer are frequent and are aggravated by scorching winds. The harvest period, however, is often characterized by inclement weather, which makes drying the grain a major problem and seriously complicates the operations of the combines.

The conclusion is unavoidable that the new program is extending grain production into a risky zone, where unstable yields and frequent crop failures may be expected. The Kremlin apparently is willing to gamble, banking on the fact that with favorable weather, as in 1954, good crops may be grown on this land when it is brought into production for the first time. Durum wheat is receiving strong emphasis in the current program, for it reacts particularly well to new land.

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[2] *See* Lazar Volin, *A Survey of Soviet Agriculture,* Agriculture Monograph No. 5, p. 104, 1951.

[3] *Zemledelie,* No. 4, p. 6, 1954.

Soviet specialists place great store on the need to improve farm practices, on the "agrotechnique," on adapting farm methods to semiarid conditions. Much is made, for instance, of keeping snow on the fields in winter, of timely plowing and sowing, of special tillage methods, and so forth. This, however, is not a new theme in the Soviet Union, and experience suggests that progress cannot be quickly achieved along agrotechnical lines. Even if allowance is made for some improvement in farm practices, Soviet expectations of fairly high grain yields seem to be problematic. With normally low yields, however, a sizable addition to the Soviet grain supply, especially of wheat, and consequently additions to its exportable capacity, might be expected from such an enormous acreage when weather conditions are not too adverse. At the same time, a possibility cannot be ruled out that the Soviet Government may yet abandon or seriously curtail this grandiose scheme just as it has jettisoned similar gigantic projects in the past.

Next, the organizational or institutional structure must be considered. The heavy reliance that will be placed on state farms for reaching the goal in 1956 suggests that the state farms are being restored to the status of the so-called grain factories of the early 1930's, many of which were organized in the regions of the present expansion. Shortly after their establishment, however, state farms came in for severe official criticism by their creators for location in unsuitable areas, low yields, high production costs, poor farm practices, and generally inefficient management of the mechanized equipment.[4] In the later 1930's the grain area on state farms of the eastern regions decreased as a result of a deliberate deflationary policy, in conformity with which some state farm land was turned over to the collective farms. Historical experience, therefore, and the strictures that already have appeared on the performance of these farms in connection with the new grain program, do not augur well for their new functions. But it is necessary to reckon also with more and better equipment and more experienced and better trained personnel, all of which may make a difference.

Although the expansion of grain acreage is the central facet of the new grain program, measures also were adopted in June 1954 to increase the economic incentives to grain producers. These measures were similar to earlier ones for other major crops and animal products,[5] and were extended to oilseeds as well as grains. The compulsory grain delivery quotas per hectare of land at low fixed prices were decreased for collective farms and entirely abandoned for the kitchen garden plots of peasants and workers. Also, all arrears on compulsory deliveries of grains and payment in kind to state machine-tractor stations for their services to collective farms were canceled. It was reiterated that the compulsory delivery quotas are not to be arbitrarily increased—a provision of the existing law which was observed more in the breach than in the performance. The milling tax in kind for the grinding and processing of grains and oilseeds, which was another source of supply of these products for the Government, was replaced by cash payments. Payments in kind for the work performed by machine-tractor stations on collective farms, which constitute a highly important source of grain supply for the state, are calculated, beginning with 1954, not on the basis of biological yields, but at rates fixed for each operation—doubtless fixed so as to compensate the Government for the changes made.

There are indications that the reduction in compulsory deliveries is substantial. It is to be compensated for by state purchases of grain from the farmers, but at higher prices. It should be noted, however, that these extra-quota state purchases, though theoretically voluntary, are included within the scope of official government plans. And there are, of course, the substantial payments in kind to state machine-tractor stations. Pressure by Soviet authorities, therefore, will continue to be exerted for extraction of large quantities of grain from the collectivized agriculture, though probably on somewhat more favorable terms. Thus, the battle for grain in Soviet Russia is not yet ended.

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[4] *See* W. Ladejinsky, "Soviet State Farms," *Political Science Quarterly*, v. 53, pp. 60-82, 207-232, 1938.

[5] See Lazar Volin, "The Malenkov-Khrushchev New Economic Policy." *Journal of Political Economy*, v. 62, pp. 187-209. June 1954.

...On U.S. Agricultural Exports*

By RALPH S. ROBERTS

The Government of the United States recognizes that United States agriculture, as well as other segments of the United States economy, stands to gain from a sustained policy of expanding world trade, based upon the most economic and most efficient use in each country of the available labor, natural resources, and capital. Therefore it recognizes that it is in the long-run interest of the United States to work with other nations in a mutual effort to expand international trade, and to promote the fuller convertibility of currencies, the freer movement of commodities, the freer movement of investment capital, and the interchange of technical and scientific information.

My Government also recognizes that the capacity of certain areas of the world to produce food and fiber in excess of present market takings presents a basis and a hope for improving living standards around the world—provided ways can be found for improving marketing and distribution systems and enlarging the purchasing power of consumers. We recognize, therefore, that a challenge exists to the nations of the world to develop sound means of utilizing their productive capacity in the improvement of living standards.

In this connection we endorse the emphasis of the last Conference on selective expansion of production and development of consumption. We are glad to note the progress in this direction reported by the Director-General in his statement on this subject. We believe that the policy of encouraging production only of those products that are needed in certain areas is sound and that it should apply to the technical assistance program as well as to the consultative efforts already undertaken.

In developing its agricultural program, the United States has tried to consider the position of friendly countries. Today, the United States agricultural situation is complicated by two factors on the domestic front: (1) Production of certain farm products is out of balance with demand, thus creating surplus stocks which overhang and tend to unsettle both domestic and foreign markets; and (2) domestic prices of many exportable farm products are not competitive with world prices. It must be recognized that our post-Korean surpluses largely have been accumulated in 2 years when the indexes of all crop yields were at or near record high levels.

Indeed, the magnitude of the United States holdings of many commodities is such as to be capable of demoralizing world commodity markets should a policy of reckless selling abroad be pursued. The Government of the United States therefore believes that the world supply and demand situation in agricultural products requires, in the interests of the general welfare, an orderly and gradual liquidation of its surpluses. Such a policy, arrived at with the full knowledge of friendly nations, will go far to eliminate fear arising from uncertainty.

Necessarily, the policy to promote an orderly and gradual liquidation of agricultural surpluses must apply in both the domestic and international spheres.

The United States is dealing with the surplus problem in a number of ways. First, a large part of existing surpluses has been removed from access to commercial markets by a "set aside" program. Under this program up to \$2½ billion of agricultural commodities will be held in reserve during periods of adequate supply, for use only in outlets which do not cause major interference with normal channels of trade. The commodities—consisting of wheat, cotton, cottonseed oil, butter, nonfat dry milk solids, and cheese—will be rotated as needed to preserve quality. Disposition will be made through such uses as school lunch programs, disaster and relief feeding programs at home and

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* Presented at the 20th Session of the Council of the Food and Agriculture Organization of the United Nations, in Rome, October 1.

abroad, development of new markets, the national stockpiling program, and other emergency uses.

Second, the United States is revising its domestic farm programs through the enactment of the Agricultural Act of 1954 so as to bring production and demand into better balance, and to discourage the further formation of excessively large surpluses. The principle of flexibility in farm price support levels has been established to encourage needed production adjustments. And production control programs have been firmly applied to the production of a number of basic crops which now are in greatest surplus. Land devoted to wheat production has been reduced by more than 16 million acres during the past year. Land devoted to cotton production has been cut back by over 5 million acres.

Internationally, the United States is following a policy consistent with these domestic efforts. It seeks to find constructive use for its surplus supplies in needy areas of the world just as it seeks to find constructive use for its surpluses within the United States. And it also seeks to do these things in ways which will not jeopardize the normal structure of world agricultural markets.

At the same time, however, President Eisenhower has pointed out that the United States cannot accept the role of limiting its sales in world markets until other countries have disposed of all their production. The adjustment of world supply to world demand, he has stated, will require adjustments of production and expanded use in other countries, as well as in the United States.

I should like to quote the President's policy statement of September 9, 1954, relevant to these points. The President stated:

"The United States cannot be satisfied with the position of holding its own supplies off the market and accumulating surpluses while other countries dispose of their entire production. Accordingly, the United States will offer its products at competitive prices. At the same time, the United States will not use its agricultural surpluses to impair the traditional competitive position of friendly countries by disrupting world prices of agricultural commodities.

"The United States will seek in cooperation with friendly countries to utilize its agricultural surpluses to increase consumption in those areas where there is demonstrable under-consumption and where practical opportunities for increased consumption exist or can be developed in a constructive manner. The United States will attempt to utilize such opportunities in a manner designed to stimulate economic development in friendly countries and to strengthen their security position."

The United States Congress has recently enacted the Agricultural Trade Development and Assistance Act of 1954. Under this Act, agricultural surplus commodities, aggregating $700 million in value, may be sold abroad at competitive prices for local currencies over a 3-year period. The foreign currencies which accrue under the program may be used for various purposes, including the promotion of international economic development and trade, the payment of United States obligations abroad, and the financing of international educational exchange activities. The Act also provides that agricultural commodities, up to $300 million in value, may be given to friendly peoples in the event of national disaster or famine.

In implementing the Development and Assistance Act—and in all its other foreign trade relationships—the United States recognizes the important role of private business in maintaining the strength and stability of world agricultural markets. It recognizes that the movement of goods in foreign trade is highly dependent upon the enterprise of private business—foreign and domestic. And it thus seeks to assure conditions of commerce which permit the private trader to function freely and effectively.

The United States believes that the long-range solution to the world surplus problem will not be found in the use of indiscriminate dumping programs but in programs for expanding consumption and adjusting agricultural pricing, production, and trade programs in such a way that supplies will be brought into balance with demand. The long-range objective should be to expand domestic and foreign markets by economic development activities, removing trade barriers, reducing costs, improving quality, and intensifying sales efforts so as to make possible the full and efficient use of agricultural resources with minimum reliance upon governmental action in all friendly countries throughout the world.

The Sindri plant near Dhanbad, Bihar, India, is one of the largest ammonium sulfate plants in the world. Still, the country's fertilizer needs are far from met.

Soil Productivity and Fertilizer Requirements in India

By WILHELM ANDERSON

After 2 years of drought and crop failure, India now has had 2 years of exceptionally good crops; and, for the immediate future, prospects for sufficiency in food grains look bright. But what about the long-range outlook? Is it possible that these 2 good years indicate a change in India's long-time trend toward greater food grain deficits? Or is it more likely that a rapidly increasing population, limited arable land, and low yields per acre will combine to continue the old trend?

The crop successes of the past 2 years are enhanced by contrast with the failures of the 2 years that preceded them. In 1950-51 and 1951-52 the monsoons failed and India suffered widespread droughts; its output of food grains (cereals and pulses) fell well below the 61-million-ton average for the preceding 4 years (1946-50), totaling only 59.4 million short tons in 1950-51 and 58.6 million in 1951-52. Famines were averted only by compulsory food grain procurement and rationing, plus large imports of food grains—5.4 million short tons in calendar year 1951 and 4.3 million in 1952.

In 1952-53, a good crop year, production of food grains totaled 62.8 million tons;[1] imports of 3.3 million tons upped the available total to 66.1 million tons. After deductions were made for seed, industrial uses, and waste, what remained was enough to give each person 316 pounds of food grain a year, or 1,388 calories a day. But even this amount, improvement though it was over the preceding year, is a low intake. It is 54 pounds less per person than the 370 pounds accepted as the norm for food grain consumption in India; and this deficit, when computed for 370 million people, mounts to a total of 10 million short tons.

The food grain crop in 1953-54 was even better than the previous one. Production is estimated at 72.5 million short tons, which, even with greatly reduced imports, promises per capita availabilities considerably higher than in 1952-53.

But the good crops of the past 2 years appear to be more attributable to exceptionally favorable weather than to permanent improvements in the factors of production. True, some permanent improvements have been made in the water supply and in fertilizer availabilities during these 2 years, and the farm extension program has improved cultural practices, but the combined effect of all these changes certainly would not account for an increase of 13.9 million tons of food grains in 2 years. Rather, they are more likely to have brought into being a sustainable annual increase of only about 2 million tons. Thus, though the two good harvests have temporarily eased the Indian food grain crisis, they should not be interpreted as

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[1] The revised final estimates of food grain production in India in 1952-53 may increase this figure by almost 1 million tons.

an occasion for complacency. In the long run, India still has a formidable problem in bringing its production of food grains up to the level of requirements.

A helpful approach to the long-range outlook is to examine and evaluate the comprehensive and detailed analysis of India's food supply situation that has been written by the Registrar of India, R. A. Gopalaswami.[2] In this excellent analysis he reviews the situation as it has developed over two 30-year periods—1891-1920 and 1921-50—and portrays it as he envisages it for 30 years to come.

The Indian Analysis

From 1891 to 1920. In the first 30-year period, Mr. Gopalaswami points out, undivided India (India and Pakistan) was a food-grain-surplus area. In 1891 the area that is now India had 235.9 million people. Thirty years later there were 248.1 million, an increase of only 12.2 million; normal growth had been held down by famine and pestilence. The area of cultivated land per capita increased from 1.09 to 1.11 acres; but the yield of rice per acre appears to have declined slightly. By the end of the period undivided India (exclusive of Burma) had ceased to be a food-grain-exporting area.

From 1921 to 1950. The year 1920-21 was a turning point in India's food-supply situation. For the next 30 years, apart from the Great Bengal Famine of 1943, in which some 1.5 million people perished, India was largely free from famines and pestilences. The population grew from 248.1 million to 356.9 million, an increase of 108.8 million (for the period as a whole, the rate of increase averaged 1.2 percent annually, but for the last decade it was slightly higher). Cultivated land per capita decreased from 1.11 acres to 0.84 acre, and the yield of rice per acre declined 17 percent, from 900 pounds, milled basis, to 745 pounds.[3] Imports of food grains increased from nothing to an average of about 3.7 million short tons.

From 1951 to 1980. As to what may be expected 30 years from now, in 1980, the Indian analysis forecasts the population at 520 million, total food grain requirements at 93 million short tons, and annual food grain production at 82 million tons.

The envisaged food grain production for 1980 is an increase of 21 million tons above the base figure of 61 million tons, the average for 1946-50. The increase is seen as coming into being as follows (the analysis indicates that 78 percent of the gross area sown is devoted to food grains):

3.43 million tons from an increase in cropped area, including expansion of double cropping. Of a total increase of 30 million acres, food grains would occupy 23.4 million acres.

6.9 million tons from an increase in irrigated area. Of a total increase of 40 million acres, 31.2 million acres would be devoted to food grains.

10.3 million tons from all other measures for increasing yields per acre, such as use of chemical fertilizers, green manure, and home-made manure, improved crop rotations, disease and pest control, and better seed. These measures would be applied to 140 million acres; 109 million acres would be devoted to food grains.

The third of these anticipated increases in food grain production—103 million tons—is broken down further as follows: 3.43 million tons from the *concentrated* use of chemical fertilizer, in addition to all other improved practices, on 15.6 million irrigated acres having an assured water supply; 3.43 million tons from the *modest* use of chemical fertilizer, in addition to all other practices, on 31.2 million irrigated acres having a reasonably adequate water supply; and 3.43 million tons from all improved practices *except* the use of chemical fertilizer, on 62.4 million acres of unirrigated land with low rainfall.

Obviously the 21-million-ton increase in annual food grain production is not enough to meet the requirements of the population in 1980, even at the current consumption level. It is 11 million tons less than the estimated requirements; in fact, it will meet the needs of only 450 million people, a population figure that is expected to be reached as early as 1969.

Appraisal of the Indian Analysis

The question now arises, Has the Indian analysis exhausted all available means of increasing food grain production?

As for what may be anticipated in the way of an increase in acreage, Mr. Gopalaswami has probably exhausted all possibilities. Inasmuch as some of the land now tilled in India is marginal under present methods of cultivation, it is perhaps unwarranted to anticipate that India will increase its cropped area more than 30 million acres in the next 30 years. Experience elsewhere indicates that not too much reliance should be placed on this means of increasing production except through double cropping, which has considerable promise if used in association with an assured water supply and a liberal use of chemical fertilizer.

Nor is any argument had with the analysis in its anticipated increases through irrigation. Increasing the area under irrigation is one phase of the country's agricultural development program that receives great emphasis in both Mr. Gopalaswami's analysis and the Government of India's series of 5-year plans. The country now has about 50 million acres under irrigation, a development that has taken centuries to accomplish. The first 5-year plan is currently undertaking to add an additional 28 million acres, at a cost of $1.1 billion. Although this goal may not be reached until well into the second 5-year plan, there seems little reason to doubt that it will be reached. The Indian analysis further indicates that it may be possible through subsequent 5-year plans to irrigate an additional 12 million acres by 1981, bringing the total to 90 million. No irrigation undertaking of similar magnitude has ever been attempted anywhere else: Such heroic measures indicate the earnestness with which the Government and people of India are approaching the alleviation of their food deficit.

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[2] *Census of India, 1951*, v.1, part I-A Report, chapters 4 and 5.

[3] These data on rice yields are added by the author; they do not appear in the Indian analysis.

Exception *is* taken, however, to the estimate for the third way of increasing food grain production—by applying improved farming practices other than irrigation. On this point it would appear that the analysis has not exhausted the possibilities. After all, India's yields of food grains are exceptionally low—averaging 516 pounds per acre in 1949-50, 466 in 1950-51, 476 in 1951-52, and 510 in 1952-53—and it should not be too difficult to improve them.

In the first place, the analysis seems to take an inadequate measure of what can be accomplished by the use of improved cultural practices *other* than the use of mineral fertilizer. Why it limits these practices to 140 million acres, an area that is only about one-half of the cultivated land in India, is not readily apparent. Over a 30-year period it should be possible for the recently established Indian national extension service to bring about such a general adoption of these practices as would increase yields of all food grains a sustainable average of 100 pounds an acre. On 250 million acres that would mean 12.5 million short tons—and that is regarded as a conservative estimate of what may be expected.

In the second place, the analysis does not take adequate account of increases in production that might be brought about by the increased use of chemical fertilizer. When it assumes that, by 1980, chemical fertilizer will be applied to only 60 million irrigated acres (intensively on 20 million and modestly on 40 million)[4] it leaves 30 million of the total irrigated acreage—to say nothing of a substantial area with assured rainfall—with no chemical fertilizer applications at all. Why this should be so is not apparent. Experience elsewhere in the world indicates that the liberal use of chemical fertilizer on a much larger area than that scheduled in the analysis could bring about an increase large enough not only to cover the 11-million-ton deficit anticipated for 1980 but also to raise substantially per capita caloric intake.

India now has about 250 million acres in food grains: 200 million acres in cereals (75 in rice, 25 in wheat, 100 in other cereals) and 45 million to 50 million in pulses. About half of the cereal acreage has a reasonably adequate water supply; the other half is dryland. Experience elsewhere indicates that if an average of 30 pounds of net nitrogen per acre was applied over the 100 million acres of cereals having a reasonably adequate water supply, it would take 1.5 million short tons of net nitrogen; but if it was judiciously applied, with the needed supplements of phosphoric acid (P_2O_5) and potash, it would probably bring into being an additional 15 million tons of cereals. Then, if 1 million tons of nitrogen was similarly applied to the 100 million dryland acres in cereals, it would probably result in a further increase of 8 million to 10 million tons, though results would vary with rainfall. In addition, the yields from

A housewife near Agra carries homeward a basket of fuel. The traditional use of manure for fuel in India deprives the soil of much-needed organic fertilizer.

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[4] These figures include acreage devoted to crops other than food grains.

Table 1.—*An estimate of food grain*[1] *and fertilizer requirements in India, 1952-53 to 1979-80*

Year	Estimated population[2]	Food grain availabilty per person		Estimated food grain requirements[3]	Increment in food grain requirements over 1952-53	Estimated chemical fertilizer required to produce one-half of food grain increment[4]	
		Pounds per year	Calories per day			Nitrogen	P_2O_5 and K_2O
						Short tons	*Short tons*
1952-53	370,000,000	316	1,388	[5]66,100,000	——	100,000	10,000
1959-60	398,632,000	319	1,400	72,800,000	6,700,000	352,000	143,000
1964-65	424,177,000	330	1,450	80,200,000	14,100,000	628,000	288,000
1969-70	451,359,000	341	1,500	88,300,000	22,200,000	932,000	448,000
1974-75	480,283,000	352	1,550	96,900,000	30,800,000	1,255,000	618,000
1979-80	511,062,000	363	1,600	106,100,000	40,000,000	1,600,000	800,000

[1] Food grains include cereals, gram, and other pulses.

[2] Net increase in population computed at 1¼ percent annually.

[3] Computed to allow 87½ percent for food; the rest, for seed, waste, and industrial uses. Stocks have been adjusted upward slightly for increases in population.

[4] It is assumed that the other half of the increment will be met by expansion of area sown, improvements in irrigation, and all other approved cultural practices except use of chemical fertilizer.

[5] Includes 62,800,000 tons from domestic production and 3,300,000 from imports.

the 45 million to 50 million acres in pulses, which in recent years have averaged as little as 400 pounds per acre, probably could be readily doubled in the course of a few years by the liberal use of phosphoric acid and potash, lifting the yield of pulses by 8 million to 10 million tons. Thus a total increase of 31 million to 35 million tons of food grains might be accomplished from a judicious use of chemical fertilizer alone.

In contrast to such possible increases, the estimate in the Indian analysis seems particularly restrained. The analysis indicates use of fertilizer for only 46.8 million out of India's 250 million acres under food grains, with a resulting sustainable increase of 6.9 million short tons of food grains. If it is assumed that on these 46.8 million acres all approved practices other than fertilizer will increase yields 100 pounds per acre, or 2.3 million short tons, then fertilizer would account for the rest, or 4.6 million short tons. Such an increase in food grain production from chemical fertilizer represents only about 22 percent of the total increase anticipated by the analysis and only 5½ percent of the anticipated total production.

An Estimate of India's Future Food Grain And Fertilizer Requirements

The position is taken here that in the next 30 years India should be able to increase its food grain production by 40 million tons—nearly twice as much as the estimate offered by Mr. Gopalaswami. It is assumed that one-fourth could come from irrigation and expansion of area sown, one-half from use of chemical fertilizer, and one-fourth from other approved practices.

Table 1 assumes that over the next 27 years the population of India will increase to 511 million. This assumption is based on an average annual rate of increase of 1¼ percent, the rate prevailing in 1941-50, a period in which the infant mortality rate was high and the Great Bengal Famine occurred. There is therefore little reason to expect the rate of increase to be lower and, with the emphasis now being given in India to health and sanitation, considerable reason to expect it to be higher.

The table also assumes that during the next 27 years the Government of India will try to increase the daily per capita intake of food grains from 1,388 calories to 1,600, the amount now enjoyed by all countries of southeast Asia, including Indonesia. If the Indian people are to be fed in keeping with such an increasing intake, there is little doubt that the food grain requirements will be about what the table indicates. The important question is this: Will India take such further heroic measures as may be necessary to produce the grain to feed its people? If not, the deficiency must be met by imports or the people must do without.

In the table an attempt has been made to indicate roughly, in keeping with results obtained in Korea, Japan, and elsewhere, the minimum quantities of net chemical plant nutrients that would have to be applied annually to the food grain acreage in the next 27 years to assure that 50 percent of the increment in food grain requirements will be met through increased production from the use of chemical fertilizer. To assure such an increase in production, fertilizer will have to be used not only on irrigated areas but also on the nonirrigated assured-rainfall areas, and even on some of the low-rainfall areas although it may not be as effective there as elsewhere; eventually, as fertilizer supplies become more adequate, national policy may require that fertilizer be applied on all land worth planting, as has been done in Japan.

The need for fertilizer builds up fairly fast, as the table shows. For nitrogen it builds up at the rate of 50,000 short tons annually in the first part of the period, reaching 352,000 tons in 1960 and 628,000 tons in 1965, and builds up at an even faster rate as the period continues, until in the year 1980 the addition to plant capacity will have to be about 75,000 tons. Such rates of increase mean that India should be completing a new 100,000-ton net nitrogen plant every other year through 1970. Thereafter, the capacity of the plants has to be increased, or more of them have to be built. For phosphoric acid and potash, a new 50,000-ton plant will have to be added every other year through 1970, and larger additions will have to be made in the next decade, if the requirements for 800,000 tons in 1980 are to be met.

This is a large program of fertilizer-plant expansion, especially when viewed in the light of the large amounts of money that during the same period must be spent on river-valley and other irrigation works to assure a water supply that will make the fertilizer as effective as possible. The cost of building the nitrogen plants at present prices would probably run in the neighborhood of $1 billion. Of course the cost of all the fertilizer-plant developments would be spread over the entire 30-year period, but, even so, the total annual expenditure would probably be about $40 million, becoming somewhat larger toward the end of the period.

So far as can be determined, however, the Government of India has not as yet embraced the idea that it must make and put to use ever-increasing quantities of commercial fertilizer if it is to get half of its needed increases in food grain production from that source. None of the literature that has come from India, including that released by the National Planning Commission, puts forth any firm plans for an expansion of fertilizer capacity that would be in keeping with the minimum requirements visualized in table 1. Even the first 5-year plan makes no provision for new nitrogen plants. True, there are estimates that by 1960 India will have facilities for producing about 200,000 long tons of net nitrogen—130,000 long tons through expansion of the Sindri plant, 12,000 through expansion of FACT, 10,000 from other utilization of byproduct gas, and possibly 50,000 from a new plant to be constructed—but this is 130,000 short tons under the minimum requirements estimated in table 1. As to plans for expanding production of phosphoric acid and potash, no information is at hand.

It is therefore concluded that for the indefinite future India will continue to import food grains or fertilizers in quantities that will grow ever larger beginning in 1956-57.

Food grain requirements in 1959-60 are likely to be about 6.7 million short tons higher than they were in 1952-53, when 3.3 million short tons were imported to augment the country's supply. In other words, food grain requirements in 1959-60 are likely to be 10 million tons above what the country produced in 1952-53. Since by 1960 the domestic production of nitrogen is not likely to be much above 200,000 long tons, and the production of P_2O_5 and K_2O not more than 75,000 tons, what may be expected by that time as the sustainable increase in food grain production from all sources? The view taken here is that it is not likely to exceed 8 million tons (an increase of 1.8 percent a year over the 7-year period) leaving a deficit of 2 million tons to be met by imports of either grain or fertilizers. To expect a larger increase in production in the face of such a limited use of fertilizer would seem to be unrealistic and not in keeping with experience elsewhere in the Far East.

Japan's experience over the past 70 years may shed some light on what could occur in India. During that period the Japanese built a large fertilizer industry. In the early and middle years of that period they used large quantities of commercial organic fertilizer. They have always used much home-made manure. In recent years their use of inorganic fertilizer on their 15 million acres of arable land has averaged 400,000 metric tons of net nitrogen, 250,000 tons of phosphoric acid, and 175,000 tons of potash. Decade by decade, their average yields of rice per acre have increased. In marked contrast, yields in India during the past 50 years show an overall decline, although they now appear to have been stabilized at a low level.

Decade	*Yield (pounds of milled rice per acre)*	
	Japan	India
1881-90	1,505	
1891-1900	1,630	
1901-10	1,848	920
1911-20	2,089	900
1921-30	2,143	840
1931-40	2,291	818
1941-50	2,345	745

Thus the level of rice yields in India today is only half of what it was in Japan 70 years ago.

What factors brought about this decline in India's yields? Since the climate probably has not changed appreciably and the tillage practices probably remain relatively unchanged, one is left with the conclusion that the decline in yields has been due largely to continuous cropping without adequate replenishment of plant nutrients. Some of the decline may have been occasioned by the addition of less productive lands to the rice acreage. But even these lands are not likely to become much more productive unless plant nutrients are added. Addition of water alone can only make those plant nutrients which are already in the soil more effective.

How then can the trend be reversed? If the above diagnosis even approximates the major cause of the decline in yields, it is unlikely to be reversed unless the soil is substantially replenished.

Leguminous green manures will help, for they improve the texture of the soil and add some nitrogen. But they do so at a cost that must be reckoned with: They require water, add no phosphorus, and sometimes occupy the land when food is immediately desired. Experience elsewhere in the Far East indicates that not too much reliance should be placed on them, although it may be that they have a larger place in India than elsewhere.

Home-made manures, too, will help to replenish the soil and improve its texture, but their limitations should be recognized. India has a large livestock population, which consumes practically all roughage, and leaves very little from which home-made manures can be made. As for the manure from these animals, so much of it is used for fuel that it cannot be counted as a substantial source of soil nutrients.

One is left, then, with commercial fertilizers and largely inorganic chemicals. It is upon these that India must place its primary reliance in rebuilding its soil.

To develop an adequate chemical fertilizer industry in India will take much time, but that time need not be wasted. Much can be done to inform farmers about the value of fertilizer well used. Plant breeding can be done on cereals to get varieties highly responsive to fertilizer applications. Soils will have to be tested on a broad scale to determine nutrient deficiencies; already India has established 16 soil-testing laboratories in as many States. Fertilizer tests are being conducted throughout the country, and more are being scheduled, to determine responses to different fertilizer applications; findings will be applied as test demonstrations on the widest possible scale.

Along with this good work of research and education must go the building of an efficient distribution and marketing system for fertilizers and the perfecting of a credit system that will make the fertilizer available to farmers when they need it.

All of these things India has already begun to do, but it needs to do them on a much broader and more intensive scale. It also must carry on important planning, engineering, and financial work in New Delhi to assure that the fertilizer industry will expand rapidly. The plants built must be efficient producers; otherwise the cost of the product to the farmer may be more than he can afford to pay, thus requiring subsidies which the economy of India can ill sustain.

There seems little question that India's vast resources are susceptible of such management as will assure an adequate food supply for its growing population throughout this century if concerted public attention is given to delaying the age of marriage and otherwise controlling the birth rate so that the population does not exceed, say, 550 million to 600 million by the end of the century. The Indian analysis indicates that, at best, these resources can be made to sustain only 450 million people, even at a low level of food consumption. This appears to be an unduly pessimistic outlook in view of what is now known about the possibilities of increasing food grain production through the judicious use of inorganic fertilizers.

Cuba As A Market For U. S. Agricultural Products —A New FAS Release

Cuba is the principal Latin American market for United States agricultural exports and ranks high as a supplier of agricultural imports to this country. Developments since World War II that affect this trade between the United States and Cuba is the subject of a 32-page bulletin, "Cuba as a Market for United States Agricultural Products," Foreign Agriculture Report No. 81, which has just been released by the Foreign Agricultural Service.

From the several charts and tables, the reader can readily see how dependent Cuba is on imports of grains, fats and oils, and other agricultural items and how much comes from the United States. He can see, too, how Cuba pays for its imports—by shipping abroad large quantities of sugar and molasses and smaller quantities of tobacco, henequen, fruits, and vegetables.

Since production, price, and commercial policies of the Cuban Government affect the flow of trade, both incoming and outgoing, these policies—and their relation to the movement of agricultural products from the United States to Cuba—are a part of the new bulletin.

After the bulletin went to press, data for agricultural trade in 1953 became available. These data indicate that in that year Cuba maintained its place as the first Latin American market for our agricultural exports, taking products valued at $143.3 million.

This is a reduction of 7 percent from the value of the preceding year, but compares favorably when we remember that our agricultural exports to all countries in 1953 were 17 percent smaller than those in 1952 and that agricultural exports to all of Latin America declined by 25 percent.

Export values of cured pork, lard, cotton, and dried beans dropped in 1953, whereas exports of rice increased over those of the preceding year.

Our agricultural imports from Cuba in 1953 declined by 3 percent to $378 million. This decline is accounted for largely by sugar and molasses.

(Copies of the report may be obtained from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C., for 15 cents each.)

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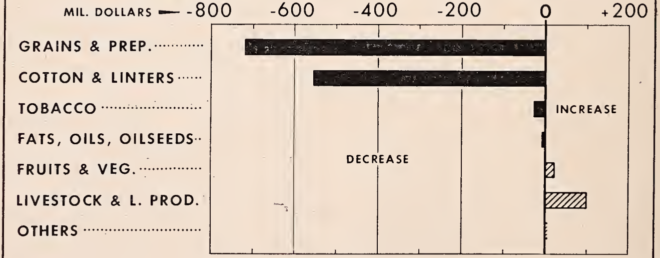
LEADING AGRICULTURAL EXPORT COMMODITIES DECLINE, OTHERS INCREASE

Value of Agricultural Exports for 1953-54 Compared with 1951-52



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